1. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{6x^3 - 43x^2 + 86x - 40}{3x^2 - 11x + 6}$$

A. Horizontal Asymptote of $y = 2.0$

B. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 2x - 7$

C. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x - 7$

D. Horizontal Asymptote at $y = 3.0$

E. Oblique Asymptote of $y = 2x - 7$.

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2. Which of the following functions *could* be the graph below?
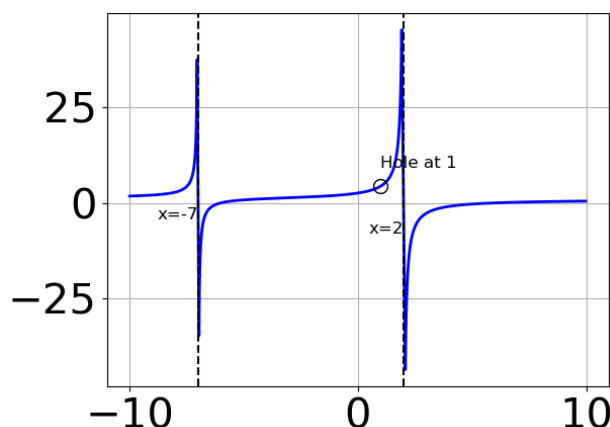
A. $f(x) = \dfrac{x^3 + x^2 - 36.0x - 36.0}{x^3 - 4.0x^2 - 19.0x - 14.0}$

B. $f(x) = \dfrac{x^3 + 4.0x^2 - 36.0x - 144.0}{x^3 - 4.0x^2 - 19.0x - 14.0}$

C. $f(x) = \dfrac{x^3 + 3.0x^2 - 36.0x - 108.0}{x^3 + 4.0x^2 - 19.0x + 14.0}$

D. $f(x) = \dfrac{x^3 - 1.0x^2 - 36.0x + 36.0}{x^3 + 4.0x^2 - 19.0x + 14.0}$

E. None of the above are possible equations for the graph.

3. Which of the following functions *could* be the graph below?
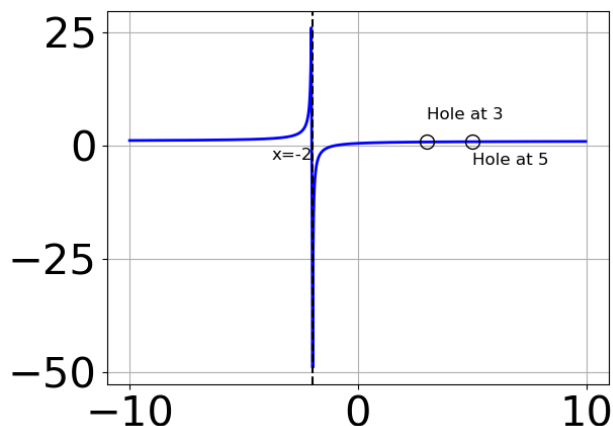
A. $f(x) = \dfrac{x^3 - 8.0x^2 + 13.0x - 6.0}{x^3 + 6.0x^2 - x - 30.0}$

B. $f(x) = \dfrac{x^3 + 7.0x^2 + 7.0x - 15.0}{x^3 + 6.0x^2 - x - 30.0}$

C. $f(x) = \dfrac{x^3 - 31.0x - 30.0}{x^3 - 6.0x^2 - x + 30.0}$

D. $f(x) = \dfrac{x^3 - 7.0x^2 + 7.0x + 15.0}{x^3 - 6.0x^2 - x + 30.0}$

E. None of the above are possible equations for the graph.

4. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{6x^3 - 49x^2 + 125x - 100}{9x^2 - 27x + 20}$$

A. Holes at $x = 1.333$ and $x = 1.667$ with no vertical asymptotes.

B. Vertical Asymptote of $x = 0.667$ and hole at $x = 1.667$

C. Vertical Asymptote of $x = 1.333$ and hole at $x = 1.667$

D. Vertical Asymptotes of $x = 1.333$ and $x = 1.667$ with no holes.

E. Vertical Asymptotes of $x = 1.333$ and $x = 2.5$ with a hole at $x = 1.667$

5. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 - 25x^2 - 82x - 40}{-6x^3 - 17x^2 + 46x + 24}$$

A. Vertical Asymptote of $y = -1.500$

B. Vertical Asymptote of $y = 4$

C. Horizontal Asymptote of $y = 0$

D. None of the above

E. Horizontal Asymptote of $y = -2.000$

6. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 - 11x^2 - 5x + 12}{6x^2 - 23x + 20}$$

A. Vertical Asymptotes of $x = 2.5$ and $x = 1.333$ with no holes.

B. Vertical Asymptotes of $x = 2.5$ and $x = 1.5$ with a hole at $x = 1.333$

C. Vertical Asymptote of $x = 1.0$ and hole at $x = 1.333$

D. Vertical Asymptote of $x = 2.5$ and hole at $x = 1.333$

E. Holes at $x = 2.5$ and $x = 1.333$ with no vertical asymptotes.

7. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{9x^3 + 54x^2 + 80x + 32}{3x^2 + 8x + 4}$$

A. Horizontal Asymptote of $y = 3.0$

B. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 3x + 10$

C. Horizontal Asymptote of $y = -2.0$ and Oblique Asymptote of $y = 3x + 10$

D. Oblique Asymptote of $y = 3x + 10$.

E. Horizontal Asymptote at $y = -2.0$

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8. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{5x^2 + 17x - 12}{10x^3 - 1x^2 - 53x + 30}$$

A. Horizontal Asymptote at $y = -4.000$

B. Oblique Asymptote of $y = 2x - 7$.

C. Horizontal Asymptote of $y = 0$

D. Horizontal Asymptote of $y = 0.500$

E. Horizontal Asymptote of $y = 0.500$ and Oblique Asymptote of $y = 2x - 7$

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9. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{8x^3 + 2x^2 - 27x - 18}{8x^2 - 6x - 9}$$

A. Vertical Asymptote of $x = 1.5$ and hole at $x = -0.75$

B. Vertical Asymptotes of $x = 1.5$ and $x = -1.5$ with a hole at $x = -0.75$

C. Vertical Asymptotes of $x = 1.5$ and $x = -0.75$ with no holes.

D. Vertical Asymptote of $x = 1.0$ and hole at $x = -0.75$

E. Holes at $x = 1.5$ and $x = -0.75$ with no vertical asymptotes.

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10. Determine the vertical asymptotes and holes in the rational function

below.

$$f(x) = \frac{8x^3 - 10x^2 - 13x + 15}{8x^2 - 18x + 9}$$

A. Vertical Asymptotes of $x = 0.75$ and $x = -1.25$ with a hole at $x = 1.5$

B. Vertical Asymptote of $x = 1.0$ and hole at $x = 1.5$

C. Holes at $x = 0.75$ and $x = 1.5$ with no vertical asymptotes.

D. Vertical Asymptotes of $x = 0.75$ and $x = 1.5$ with no holes.

E. Vertical Asymptote of $x = 0.75$ and hole at $x = 1.5$

11. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 + 35x^2 + 33x + 10}{3x^2 + 11x + 6}$$

A. Horizontal Asymptote of $y = -3.0$ and Oblique Asymptote of $y = 4x - 3$

B. Horizontal Asymptote of $y = 4.0$ and Oblique Asymptote of $y = 4x - 3$

C. Horizontal Asymptote of $y = 4.0$

D. Horizontal Asymptote at $y = -3.0$

E. Oblique Asymptote of $y = 4x - 3$.

12. Which of the following functions *could* be the graph below?
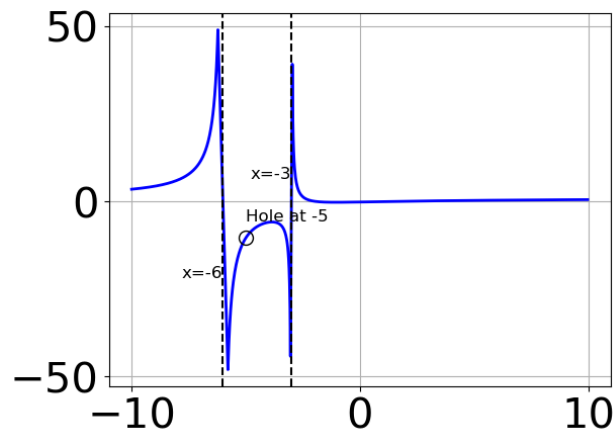
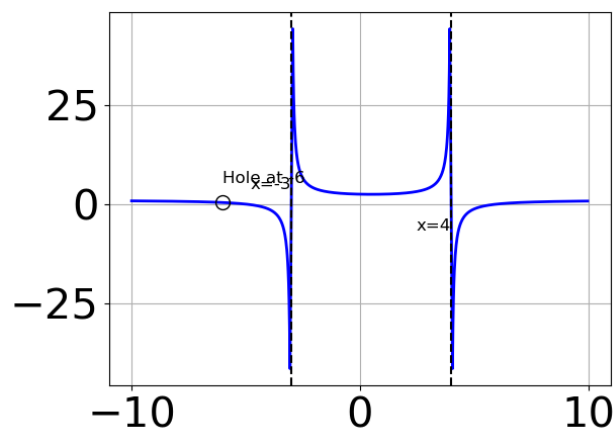A. $f(x) = \dfrac{x^3 + x^2 - 4.0x - 4.0}{x^3 - 14.0x^2 + 63.0x - 90.0}$

B. $f(x) = \dfrac{x^3 + 5.0x^2 - 4.0x - 20.0}{x^3 + 14.0x^2 + 63.0x + 90.0}$

C. $f(x) = \dfrac{x^3 - 5.0x^2 - 4.0x + 20.0}{x^3 - 14.0x^2 + 63.0x - 90.0}$

D. $f(x) = \dfrac{x^3 - 4.0x^2 - 4.0x + 16.0}{x^3 + 14.0x^2 + 63.0x + 90.0}$

E. None of the above are possible equations for the graph.

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13. Which of the following functions *could* be the graph below?

A. $f(x) = \dfrac{x^3 + 3.0x^2 - 34.0x - 120.0}{x^3 + 5.0x^2 - 18.0x - 72.0}$

B. $f(x) = \dfrac{x^3 - 5.0x^2 - 36.0x + 180.0}{x^3 - 5.0x^2 - 18.0x + 72.0}$

C. $f(x) = \dfrac{x^3 + 6.0x^2 - 25.0x - 150.0}{x^3 - 5.0x^2 - 18.0x + 72.0}$

D. $f(x) = \dfrac{x^3 + 5.0x^2 - 36.0x - 180.0}{x^3 + 5.0x^2 - 18.0x - 72.0}$

E. None of the above are possible equations for the graph.

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14. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{12x^3 + 7x^2 - 72x + 45}{12x^2 + 7x - 12}$$

A. Vertical Asymptote of $x = 1.0$ and hole at $x = 0.75$

B. Vertical Asymptote of $x = -1.333$ and hole at $x = 0.75$

C. Vertical Asymptotes of $x = -1.333$ and $x = 1.667$ with a hole at $x = 0.75$

D. Holes at $x = -1.333$ and $x = 0.75$ with no vertical asymptotes.

E. Vertical Asymptotes of $x = -1.333$ and $x = 0.75$ with no holes.

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15. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{6x^3 - 1x^2 - 72x - 80}{4x^3 + 14x^2 - 31x + 60}$$

A. Vertical Asymptote of $y = 4$

B. Horizontal Asymptote of $y = 1.500$

C. Vertical Asymptote of $y = 1.500$

D. None of the above

E. Horizontal Asymptote of $y = 0$

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16. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{12x^3 - 79x^2 + 144x - 80}{12x^2 - 25x + 12}$$

A. Vertical Asymptote of $x = 1.0$ and hole at $x = 1.333$

B. Holes at $x = 0.75$ and $x = 1.333$ with no vertical asymptotes.

C. Vertical Asymptotes of $x = 0.75$ and $x = 1.333$ with no holes.

D. Vertical Asymptote of $x = 0.75$ and hole at $x = 1.333$

E. Vertical Asymptotes of $x = 0.75$ and $x = 1.25$ with a hole at $x = 1.333$

17. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{8x^3 - 2x^2 - 43x + 30}{4x^2 - 23x + 15}$$

A. Horizontal Asymptote at $y = 5.0$

B. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x + 11$

C. Oblique Asymptote of $y = 2x + 11$.

D. Horizontal Asymptote of $y = 5.0$ and Oblique Asymptote of $y = 2x + 11$

E. Horizontal Asymptote of $y = 2.0$

18. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{6x^3 + 5x^2 - 21x + 10}{-9x^3 + 6x^2 + 4x - 4}$$

A. Vertical Asymptote of $y = 1$

B. Horizontal Asymptote of $y = 0$

C. Vertical Asymptote of $y = -0.667$

D. Horizontal Asymptote of $y = -0.667$

E. None of the above

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19. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{6x^3 - 13x^2 - 40x + 75}{12x^2 - 35x + 25}$$

    A. Holes at $x = 1.25$ and $x = 1.667$ with no vertical asymptotes.

    B. Vertical Asymptotes of $x = 1.25$ and $x = -2.5$ with a hole at $x = 1.667$

    C. Vertical Asymptotes of $x = 1.25$ and $x = 1.667$ with no holes.

    D. Vertical Asymptote of $x = 0.5$ and hole at $x = 1.667$

    E. Vertical Asymptote of $x = 1.25$ and hole at $x = 1.667$

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20. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{12x^3 + 37x^2 - 59x - 60}{6x^2 + 5x - 25}$$

    A. Vertical Asymptote of $x = -2.5$ and hole at $x = 1.667$

    B. Vertical Asymptotes of $x = -2.5$ and $x = -0.75$ with a hole at $x = 1.667$

    C. Vertical Asymptotes of $x = -2.5$ and $x = 1.667$ with no holes.

    D. Holes at $x = -2.5$ and $x = 1.667$ with no vertical asymptotes.

    E. Vertical Asymptote of $x = 2.0$ and hole at $x = 1.667$

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21. Determine the horizontal and/or oblique asymptotes in the rational function below.
$$f(x) = \frac{6x^3 - 1x^2 - 75x + 100}{3x^2 - 14x + 15}$$

    A. Horizontal Asymptote of $y = 2.0$

B. Horizontal Asymptote at $y = 3.0$

C. Oblique Asymptote of $y = 2x + 9$.

D. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x + 9$

E. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 2x + 9$

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22. Which of the following functions *could* be the graph below?
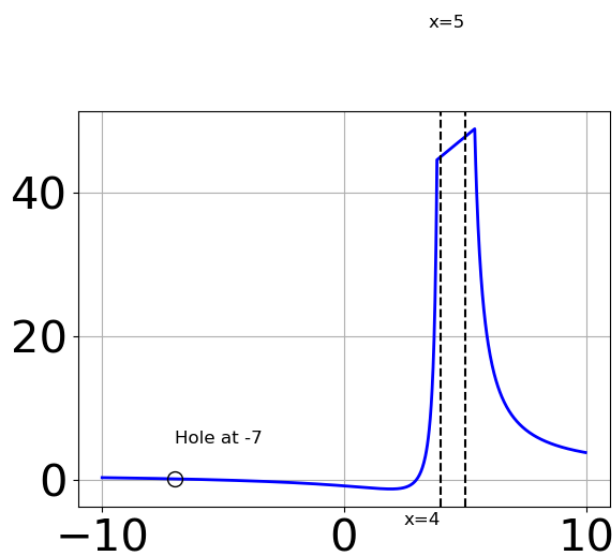
A. $f(x) = \dfrac{x^3 + 5.0x^2 - 12.0x - 36.0}{x^3 - 2.0x^2 - 43.0x + 140.0}$

B. $f(x) = \dfrac{x^3 - 10.0x^2 + 3.0x + 126.0}{x^3 + 2.0x^2 - 43.0x - 140.0}$

C. $f(x) = \dfrac{x^3 - 6.0x^2 - 9.0x + 54.0}{x^3 + 2.0x^2 - 43.0x - 140.0}$

D. $f(x) = \dfrac{x^3 + 10.0x^2 + 3.0x - 126.0}{x^3 - 2.0x^2 - 43.0x + 140.0}$

E. None of the above are possible equations for the graph.

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23. Which of the following functions *could* be the graph below?
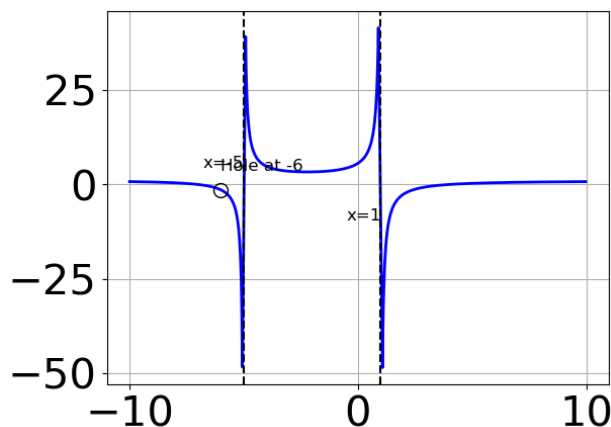
A. $f(x) = \dfrac{x^3 - 2.0x^2 - 43.0x + 140.0}{x^3 + 10.0x^2 + 19.0x - 30.0}$

B. $f(x) = \dfrac{x^3 + x^2 - 40.0x - 112.0}{x^3 - 10.0x^2 + 19.0x + 30.0}$

C. $f(x) = \dfrac{x^3 + 9.0x^2 - 10.0x - 168.0}{x^3 + 10.0x^2 + 19.0x - 30.0}$

D. $f(x) = \dfrac{x^3 - 9.0x^2 - 10.0x + 168.0}{x^3 - 10.0x^2 + 19.0x + 30.0}$

E. None of the above are possible equations for the graph.

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24. Determine the vertical asymptotes and holes in the rational function below.
$$f(x) = \frac{8x^3 - 18x^2 - 15x + 25}{6x^2 - 19x + 10}$$

A. Vertical Asymptotes of $x = 0.667$ and $x = -1.25$ with a hole at $x = 2.5$

B. Vertical Asymptotes of $x = 0.667$ and $x = 2.5$ with no holes.

C. Holes at $x = 0.667$ and $x = 2.5$ with no vertical asymptotes.

D. Vertical Asymptote of $x = 0.667$ and hole at $x = 2.5$

E. Vertical Asymptote of $x = 1.333$ and hole at $x = 2.5$

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25. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{20x^3 - 73x^2 - 34x + 24}{16x^3 + 44x^2 - 113x - 60}$$

A. Vertical Asymptote of $y = 4$

B. Horizontal Asymptote of $y = 0$

C. Vertical Asymptote of $y = -1.250$

D. Horizontal Asymptote of $y = 1.250$

E. None of the above

26. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{9x^3 - 33x^2 + 10x + 24}{12x^2 - x - 20}$$

A. Holes at $x = -1.25$ and $x = 1.333$ with no vertical asymptotes.

B. Vertical Asymptotes of $x = -1.25$ and $x = 1.333$ with no holes.

C. Vertical Asymptote of $x = 0.75$ and hole at $x = 1.333$

D. Vertical Asymptote of $x = -1.25$ and hole at $x = 1.333$

E. Vertical Asymptotes of $x = -1.25$ and $x = -0.667$ with a hole at $x = 1.333$

27. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{6x^3 + x^2 - 11x - 6}{3x^2 - 7x - 6}$$

A. Horizontal Asymptote of $y = 3.0$ and Oblique Asymptote of $y = 2x + 5$

B. Horizontal Asymptote at $y = 3.0$

C. Oblique Asymptote of $y = 2x + 5$.

D. Horizontal Asymptote of $y = 2.0$ and Oblique Asymptote of $y = 2x + 5$

E. Horizontal Asymptote of $y = 2.0$

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28. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{15x^3 + 17x^2 - 46x - 40}{-25x^3 - 20x^2 + 16x + 32}$$

A. Vertical Asymptote of $y = 0.800$

B. Horizontal Asymptote of $y = 0$

C. Horizontal Asymptote of $y = -0.600$

D. Vertical Asymptote of $y = -2$

E. None of the above

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29. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{12x^3 + 19x^2 - 101x + 60}{6x^2 - x - 15}$$

A. Vertical Asymptotes of $x = -1.5$ and $x = 1.667$ with no holes.

B. Holes at $x = -1.5$ and $x = 1.667$ with no vertical asymptotes.

C. Vertical Asymptotes of $x = -1.5$ and $x = 0.75$ with a hole at $x = 1.667$

D. Vertical Asymptote of $x = -1.5$ and hole at $x = 1.667$

E. Vertical Asymptote of $x = 2.0$ and hole at $x = 1.667$

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30. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 34x^2 + 45x - 18}{8x^2 - 2x - 15}$$

A. Vertical Asymptote of $x = -1.25$ and hole at $x = 1.5$

B. Vertical Asymptote of $x = 1.0$ and hole at $x = 1.5$

C. Vertical Asymptotes of $x = -1.25$ and $x = 0.75$ with a hole at $x = 1.5$

D. Vertical Asymptotes of $x = -1.25$ and $x = 1.5$ with no holes.

E. Holes at $x = -1.25$ and $x = 1.5$ with no vertical asymptotes.